(c) See Part 17 of this chapter concerning notification to the Federal Aviation Administration of proposed antenna construction or alteration. The provisions of §§ 74.967 and 74.981(a)(5), concerning antenna painting and lighting requirements, apply to ITFS response stations as well as main ITFS stations.

(d) All ITFS response stations communicating with a single instructional television fixed station shall operate on the same frequency. The specified frequency which may be used is determined by the channel assigned to the instructional television fixed station with which it is communicating, as shown in the following table. Operation on other ITFS response channels is prohibited.

ITFS Channel No.	ResponseFrequency (MHz)
A–1	2686.0625
A–2	2687.0625
A–3	2688.0625
A–4	2689.0625
B–1	2686.1875
B–2	2687.1875
B–3	2688.1875
B–4	2689.1875
C–1	2686.3125
C–2	2687.3125
C–3	2688.3125
C–4	2689.3125
D–1	2686.4375
D–2	2687.4375
D–3	2688.4375
D–4	2689.4375
E–1	2686.5625
E–2	2687.5625
E–3	2688.5625
E–4	2689.5625
F–1	2686.6875
F–2	2687.6875
F–3	2688.6875
F–4	2689.6875
G–1	2686.8125
G–2	2687.8125
G–3	2688.8125
G–4	2689.8125

(e) Transmitter power output will normally be limited to no more than 250 milliwatts. Upon a special showing of need, transmitter power output of up to 2 watts may be permitted.

(f) An ITFS response channel is 125 kHz wide and is centered at the assigned frequency. Either amplitude or frequency modulation can be employed. If amplitude modulation is used, the carrier shall not be modulated in excess of 100%. If frequency modulation is used, the deviation shall not exceed ±25 kHz. Any emissions outside the channel including harmonics shall be attenuated at least 60 dB below peak output power. Greater attenuation may be required if interference is caused by out-of-channel emissions.

(g) The unmodulated carrier frequency shall be maintained within 35 kHz of the assigned frequency at all times. Adequate means shall be provided to insure compliance with this rule.

(h) A directive transmitting antenna shall be employed, oriented toward the transmitter site of the associated instructional television fixed station. The beamwidth between half power points shall not exceed 15° and radiation in any minor lobe of the antenna radiation pattern shall be at least 20 dB below the power in the main lobe of radiation.

(i) The transmitter of an ITFS response station may be operated unattended. The overall performance of the ITFS response station transmitter shall be checked as often as necessary to ensure that it is functioning in accordance with the requirements of the Commission's rules. The licensee of an ITFS response station is responsible for the proper operation of the transmitter at all times. The transmitter shall be installed and protected in such manner as to prevent tampering or operation by unauthorized persons.

(j) The transmitting apparatus employed at ITFS response stations shall have received type acceptance in accordance with § 74.952.

(k) An ITFS response station shall be operated only when engaged in communication with its associated instructional television fixed station or for necessary equipment or system tests and adjustments. Radiation of an unmodulated carrier and other unnecessary transmissions are forbidden.

[34 FR 12101, July 18, 1969, as amended at 35 FR 4705, Mar. 18, 1970; 36 FR 11587, June 16, 1971; 48 FR 44807, Sept. 30, 1983; 52 FR 3806, Feb. 6, 1987; 53 FR 36788, Sept. 22, 1988; 60 FR 55483, Nov. 1, 1995]

§ 74.950 Equipment performance and installation.

(a) Except as otherwise provided in this section, the requirements of

§ 73.687 of this chapter regarding the installation and performance of television broadcast transmitters and associated equipment shall apply to instructional television fixed stations.

(b) The overall attenuation characteristics of the transmitter may vary from those specified in § 73.687 of this chapter, provided that the provisions of § 74.936 of this part are met. However, care should be exercised in the adjustment of the transmitter to insure correct overall response of the transmitter for proper transmission of the upper and vestigial lower sideband.

(c) The provisions of § 74.961 in lieu of § 73.687(c)(1) of this chapter apply with respect to the frequency tolerance for the visual carrier.

(d) The provisions of § 74.936 in lieu of § 73.687(i)(1) of this chapter apply with respect to spurious emissions and radio frequency harmonics.

(e) The requirements of § 73.687(c)(2) of this chapter will be considered to be met insofar as measurements of operating power are concerned, if the transmitter is equipped with instruments for determining the combined visual and aural operating power. However, licensees are expected to maintain the operating powers within the limits specified in the rules of this part. Measurements of the separate visual and aural operating powers should be made at sufficiently frequent intervals to ensure compliance with the rules.

(f) Transmitting apparatus (translators and boosters) used solely for relaying signals received from other ITFS stations and operating in the manner described in § 74.934(a)(2) shall meet the following requirements before being type accepted by the Commission.

(1) The frequency converter and associated amplifiers shall be so designed that the electrical characteristics of a standard television signal introduced into the input terminals will not be significantly altered by passage through the apparatus except as to frequency and amplitude. The overall response of the apparatus within its assigned channel when operating at its rated power output and measured at the output terminals, shall provide a smooth curve, varying within limits separated by no more than 4 dB: *Provided, however,* That means may be provided to reduce the amplitude of the aural carrier below those limits, if necessary to prevent intermodulation which would mar the quality of the retransmitted picture or result in emissions outside of the assigned channel.

(2) The suppression of emissions appearing outside of the assigned channel shall comply with § 74.936(b) and (c).

(3) The local oscillator employed in the frequency converter shall maintain its operating frequency within 0.02 percent of its rated frequency when subjected to variations in ambient temperature between minus 30° and plus 50° centigrade and variations in powerline voltage between 85 percent and 115 percent of the rated supply voltage.

(4) The apparatus shall contain automatic circuits which will maintain peak visual power output constant within 2 dB when the strength of the input signal is varied over a range of 30 dB and which will not permit the peak visual power output to exceed the maximum rated power output under any conditions. If a manual adjustment is provided to compensate for different average signal strengths, provision shall be made for determining the proper setting for the control. If improper adjustment of the control could result in improper operation a label bearing a suitable warning shall be affixed at the adjustment control: *Provided, however,* That apparatus with an output of 50 milliwatts peak visual power per channel or less need not comply with this paragraph, provided the equipment is so designed that the rated output power of the transmitter cannot be exceeded by more than 3 dB by an increase in the input signal.

(5) The apparatus shall be equipped with automatic controls which will place it in a nonradiating condition when no signal is being received on the input channel, either due to absence of a transmitted signal or failure of the receiving portion of the relay transmitter. In the case of equipment (translators or boosters) of 50 milliwatts peak visual power per channel or less relaying more than one channel it shall be turned off in the absence of the last signal to be relayed. The automatic

control may include a time delay feature to prevent interruptions in the operation of the relay transmitter caused by fading or other momentary failures of the incoming signal.

(6) The tube(s) or transistor(s) employed in the final radio frequency amplifier shall be of the appropriate power rating to provide the rated power output of the relay transmitter. The normal operating constants for operation at the rated power output shall be specified. The apparatus shall be equipped with suitable meters or meter jacks so that appropriate voltage and current measurements may be made while the apparatus is in operation.

(7) Boosters used in this service shall comply with all the provisions of this paragraph except with paragraph (f)(3). However, in addition, the isolation between the input and output circuits of the booster, including the receiving and transmitting antenna systems shall be at least 20 dB greater than the maximum overall gain of the booster amplifier. Boosters may use opposite antenna polarization of the input and output antennas.

[28 FR 13731, Dec. 14, 1963, as amended at 36 FR 8873, May 14, 1971; 48 FR 44807, Sept. 30, 1983; 55 FR 46014, Oct. 31, 1990]

§74.951 Modification of transmission systems.

Formal application on FCC Form 330 is required for any of the following changes or modifications of the transmission systems:

(a) Replacement of the transmitter as a whole, except replacement with a transmitter of identical power rating which has been type accepted by the FCC for use by instructional TV fixed stations, or any change which could result in a change in the electrical characteristics or performance of the station. Upon the installation or modification of the transmitting equipment for which prior FCC authority is not required under the provisions of this paragraph, the licensee shall place in the station records a certification that the new installation complies in all respects with the technical requirements of this part and the terms of the station authorization.

(b) Any change in the antenna system affecting the direction of radiation, directive radiation pattern, antenna gain, or radiated power.

(c) Any change in the overall height of the antenna structure, except where notice to the Federal Aviation Administration is specifically not required under §17.14(b) of the FCC Rules.

(d) Any change in the location of the transmission system except a move within the same building or upon the same antenna supporting structure.

(e) A change in frequency assignment.

(f) A change in the operating power.

(g) Any addition of receiving locations or to modify such a location to a receive and response station.

[45 FR 26068, Apr. 17, 1980, as amended at 50 FR 26761, June 28, 1985; 52 FR 3806, Feb. 6, 1987; 53 FR 36788, Sept. 22, 1988]

§74.952 Acceptability of equipment for licensing.

Each authorization for a station in this service requires the use of type accepted equipment. Requirements for obtaining a grant of equipment authorization are contained in subpart J of part 2 of the Rules.

(a) An application specifying a transmitter, translator, or booster not type accepted, may be filed by the applicant if the information and measurement data required for type acceptance under subpart J of part 2 of the Rules is submitted with the application. However, if that data has been filed with the Commission in connection with a request for type acceptance, it need not be resubmitted and may be referred to as ''on file.''

[52 FR 3806, Feb. 6, 1987]

§74.961 Frequency tolerance.

(a) Beginning November 1, 1991, the frequency of the visual carrier shall be maintained within ± 1 KHz of the assigned frequency at all times when the station is in operation. Until that date, the frequency of the visual carrier shall be maintained within 60 KHz of the assigned frequency at all times when the station is in operation. A transmitter licensed prior to November 1, 1991, that remains at the station site initially licensed and does not comply with this paragraph may continue to be used for its life if it does not cause